

Application No. 10/589,274
Paper Dated: July 30, 2010
In Reply to USPTO Correspondence of April 30, 2010
Attorney Docket No. 1455-062312

AMENDMENTS TO THE DRAWINGS

The attached Replacement Sheet includes changes to Fig. 5. This sheet, which includes Figs. 4-6, replaces the original sheet including Figs. 4-6.

Attachment: Replacement Sheet
Annotated Sheet Showing Changes

REMARKS

This Amendment is responsive to the April 30, 2010 Office Action. Claim 1 has been amended. The specification and Fig. 5 have also been amended. Support for the amendment to the specification and Fig. 5 may be found, for example, in the specification at page 6, paragraph [52].

Objection to the Drawings and Specification

The drawings are objected to for failing to show “an outer retention vessel having at least one coolant hole formed in a side or bottom thereof” as specified in claim 2. Further, the Examiner at pages 2-4 of the Office Action asserts that the amendments to Fig. 5 and the specification present new matter. In particular, at pages 2 and 3 of the Office Action, the Examiner asserts that showing the coolant hole in dashed lines indicates that the hole is not directly visible but still disposed at the specific location where the lines are shown.

Applicants have amended Fig. 5 such that the coolant hole (21a) is depicted by an imaginary line. Enlarged views of the bottom surface and the side of the retention vessel have also been added to Fig. 5. The specification has been amended to recite that the coolant hole (21a) in the bottom surface of the outer retention vessel (21) is depicted by an imaginary line in FIG. 5 to generally indicate that the bottom surface may include the coolant hole (21a) rather than indicating a specific location for the coolant hole (21a) in the bottom surface. Applicants respectfully submit that the amendments to the specification and to the drawing do not add new matter. In particular, paragraph [52] of the originally-filed specification states “[t]he outer retention vessel 21 includes at least one coolant hole 21a formed in a side or bottom surface thereof” (emphasis added). The hole in the bottom surface of the retention vessel has been depicted by an imaginary line to generally indicate that the bottom surface may include a coolant hole as provided in the originally-filed specification. Therefore, the amendments to the drawings and the specification are supported by the originally-filed specification and do not add new matter.

Rejections Under 35 U.S.C. § 112, second paragraph

Claims 1-3 and 5-9 stand rejected under 35 U.S.C. § 112, second paragraph, for

indefiniteness. The Examiner asserts that “the reactor vessel” in line 4 lacks antecedent basis. In view of the foregoing amendment to independent claim 1, reconsideration and withdrawal of this rejection are respectfully requested.

Rejections Under 35 U.S.C. § 103

Claims 1 and 7 stand rejected under 35 U.S.C. § 103(a) for obviousness over the cited references as follows: a) United States Patent No. 4,310,385 to Rosewell alone or in view of United States Patent No. 7,218,101 to Kuljis et al. or United States Patent No. 5,802,125 to Fife; b) United States Patent No. 5,426,681 to Aburomia alone; or c) United States Patent No. 6,195,405 to Hwang et al. or United States Patent No. 6,658,077 to Alsmeyer et al. in view of United States 5,295,169 to Tominaga et al. Claims 2, 3, 5, and 6 stand rejected under 35 U.S.C. § 103(a) for obviousness over the combination of Alsmeyer in view of Tominaga. Claims 8 and 9 stand rejected under 35 U.S.C. § 103(a) for obviousness over Aburomia. In view of the following remarks, reconsideration of these rejections is respectfully requested.

Rosewell

According to the present invention, inert gas and coolant are mixed and flowed into the molten core material retention tank (20). Therefore, the coolant of the present invention has a plurality of bubbles due to mixture with the inert gas such that it is possible to prevent a perimeter structure from being destroyed due to the explosive power of the coolant being decreased.

In Rosewell, a fluxing eutectic solute of flux material granules (65) and coolant (66) are flowed in the containment vessel (11) by a gas (67), such as nitrogen or argon. However, Rosewell fails to describe that an inert gas is mixed with the fluxing eutectic solute of flux material granules (65) and/or coolant (66). The gas (67) merely supplies operating power for discharging eutectic (65) and coolant (66) from the storage chamber (42). In normal operation, the discharge valve (46) is opened by operating temperature, and thereby the discharge chamber is opened to a conduit (22). Then, in the event of malfunction, the pressure of the conduits (22) is reduced, and thereby the pressure of the discharge chamber (43) is lowered

to a level lower than the pressure of the storage chamber (42). As a result, the valve plate (52) is opened, and the eutectic (65) and the coolant (66) are discharged by the pressure of the gas (67). Rosewell does not disclose that the gas (67) is mixed with the eutectic (65) and/or the coolant (66) (*see* column 4, lines 26-60). Therefore, Rosewell fails to disclose a mixer including piping connecting to and extending from each of the compressed gas tank and the cooling water storage tank mixing inert gas supplied from the compressed gas tank with cooling water supplied from the cooling water storage tank as in the claimed invention. Kuljis and Fife are relied upon by the Examiner to disclose a pressure vessel having a liner internal to the vessel and fail to overcome the deficiencies of Rosewell noted above.

Aburomia

Aburomia discloses combined active and passive safety systems for a boiling water reactor having reactor pressure vessel (2) with a short-term pressurized subsystem (24) and a long-term subsystem (26) for providing cooling water under force of gravity. The short-term pressurized subsystem (24) is connected to the long-term subsystem (26) via piping, which then extends to the reactor pressure vessel (2). The Examiner at page 8 of the Office Action asserts that the sump beneath the pressure vessel (2) discloses the molten core retention tank. The piping from the subsystems (24, 26), however, extends to the pressure vessel (2), not to the sump beneath the pressure vessel. Thus, Aburomia fails to disclose piping extending from the connection between the piping for the compressed gas tank and piping for the cooling water storage tank to the molten core material retention tank as recited in independent claim 1. Further, Aburomia discloses that the short-term pressurized subsystem is merely slightly pressurized at 100 psia, but fails to disclose that an inert gas is mixed with coolant.

Hwang, Alsmeyer, and Tominaga

Hwang discloses a central core (1) having a gap structure (3) and coolant reservoir (15) to prevent overheating and failing of the lower head of the reactor vessel. In Alsmeyer, coolant is provided from the coolant reservoir (9) to the porous body (3) for cooling a core melt dropped on the sacrificial material (6). However, the apparatus of Alsmeyer uses only

coolant and does not use inert gas. Tominaga is relied upon by the Examiner at page 9 to disclose an accumulator (25) and a gravity-driven water tank (26). Hwang, Alsmeyer, and Tominaga fail to disclose use of an inert gas or that coolant is mixed with matter as an inert gas. Therefore, Hwang, Alsmeyer, and Tominaga fail to disclose a mixer including piping connecting to and extending from each of the compressed gas tank and the cooling water storage tank mixing inert gas supplied from the compressed gas tank with cooling water supplied from the cooling water storage tank as in the claimed invention.

Therefore, for at least the foregoing reasons, the cited references fail to render independent claim 1 obvious. Reconsideration and withdrawal of this rejection are respectfully requested.

Claims 2, 3, and 5-9 depend from and add further limitations to independent claim 1 and are deemed to be in condition for allowance for all the reasons discussed above with respect to independent claim 1.

CONCLUSION

In view of the foregoing amendments and remarks, Applicants respectfully request reconsideration of the objections and rejections and allowance of pending claims 1-3 and 5-9.

Respectfully submitted,
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